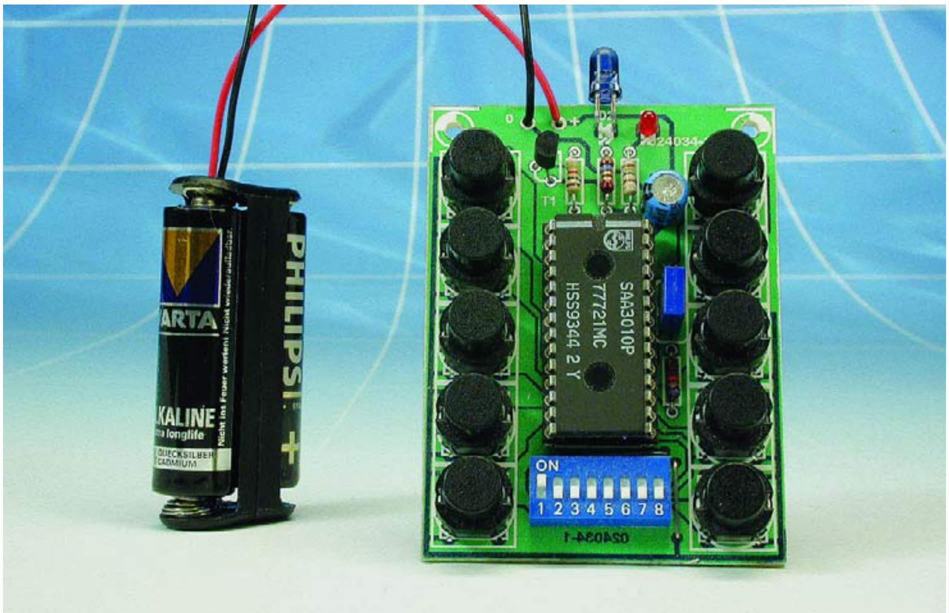
Small RC5 Transmitter



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We have published many articles in past issues of *Elektor Electronics* about IR data transmission using the Philips RC5 code. A prerequisite for these using these circuits has always been an RC5 remote control made by Philips or Loewe, or else a 'home-brew' RC5 transmitter based on the SAA3010 encoder IC. Philips has now officially discontinued its RC5 encoder, effective the end of last year. Nevertheless, it does not appear to be difficult to obtain small quantities of this IC from existing stocks — and that could remain true for some time to come. It is thus certainly worthwhile to design a simple RC5 remote control unit, especially given the availability of the PT2211 from Princeton in Taiwan and the HT6230 from Holtek, which are nearly identical alternatives.

Our objective is to have a versatile transmitter that can communicate with several different devices. As this can only be achieved by using a user-modifiable address code, an 8-section DIP switch is used to allow the system address to be selected within the range of 0–7. According to the RC5 protocol, this makes it possible to address the devices listed in **table 1** — and for our purposes, the 'DIY system address' (7) is naturally especially interesting.

A jumper (wire bridge) allows other address ranges to be alternatively selected, as shown in **table 2**. This allows the RC5 transmitter to work with all possible RC5 receivers.

Using the ten pushbutton switches, ten different commands can be sent to the device selected by JP2 and S11. Buttons S1 and S2 have a special role here: depending on the setting of

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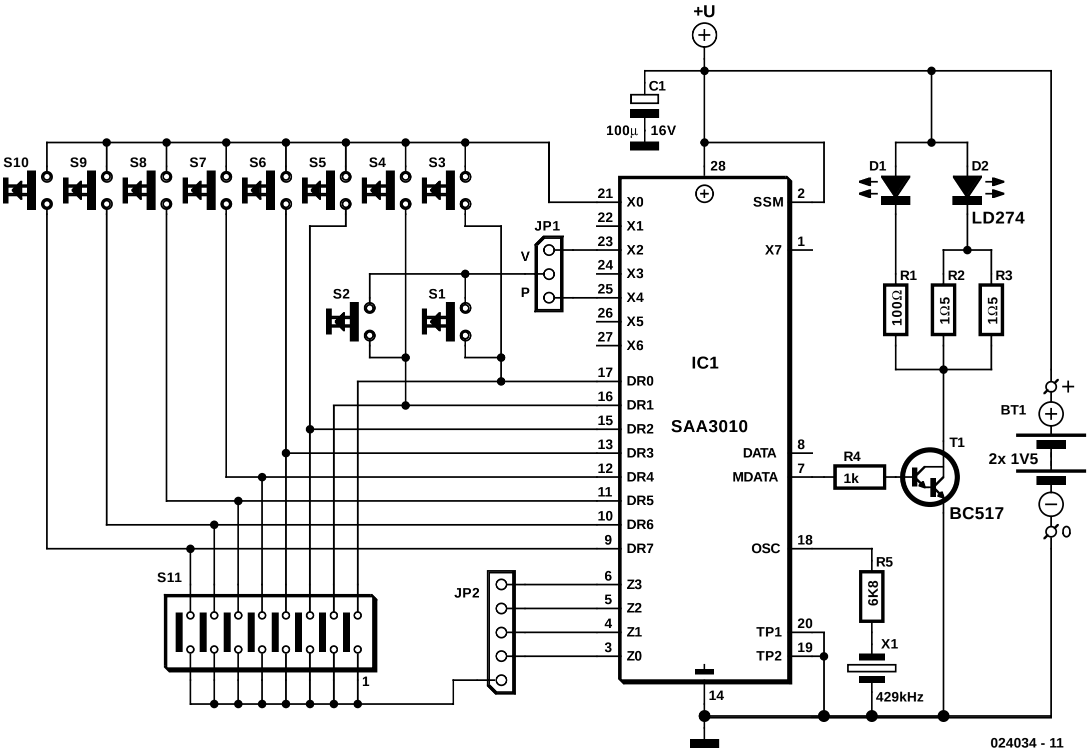

Table 1

S11	Address	Device
1	0	TV1
2	1	TV2
3	2	Videotext
4	3	Extension TV1/TV2
5	4	Laser Vision Player
6	5	VCR1
7	6	VCR2
8	7	Reserved

JP1 (which may be a jumper, a wire bridge or a small slide switch), S1 and S2 control the volume (audio) or the preset values, as shown in **table 3**. This makes our simple RC5 transmitter compatible with the Model Remote Control circuit design published in the May 2001 issue of *Elektor Electronics*.

Table 2

Address range	Jumper JP2
0–7	1–2
8–15	1–3
16–23	1–4
24–31	1–5

In other respects, the circuit shown in **Figure 1** corresponds to the specifications in the data sheet. The SSM pin is connected to Vpp, since address selection is hard-wired using the DIP switch. Philips prescribes a resonator with a 429 kHz clock frequency for compliance with the timing specified for the RC5 protocol. Using a 455 kHz resonator (which is easier to obtain) is not allowed, since it would cause the bit intervals to be shortened by around 40 µs. However, this could be taken into account in a DIY receiver design.
A BC517 Darlington transistor is used as a driver for the IR transmitter diode (D2), which emits in the 950-nm region, because of its high current gain — which is so great that it can also drive a normal LED 'on the side' as an operational indicator. The current level is set to give the remote control transmitter a range of around eight metres.

The circuit works with a supply voltage of 3 V. Two AAA or AA cells can be used as a power source. In the quiescent state, the load on the batteries is less than 10 µA.
We have designed a circuit board for this simple IR transmitter (**Figure 2**). The layout can be downloaded from the *Elektor Electronics* website (Free Downloads, item **024034-11**).

(024034-1)

Table 3

Button	Command	JP1	Command
S3	0	-	0
S4	1	-	1
S5	2	-	2
S6	3	-	3
S7	4	-	4
S8	5	-	5
S9	6	-	6
S10	7	-	7
S1	16	1-2	+ Volume
S2	17	1-2	– Volume
S1	32	2-3	+ Preset
S2	33	2-3	– Preset

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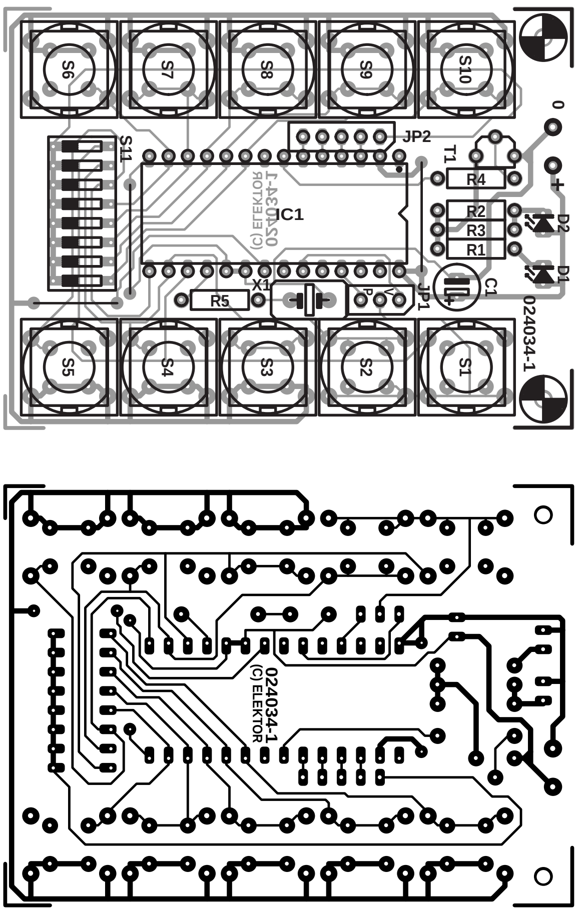

COMPONENTS LIST

Resistors:
R1 = 100Ω
R2,R3 = 1Ω5
R4 = 1kΩ
R5 = 6kΩ8

Capacitor:
C1 = 100µF 16V radial (low profile)

Semiconductors:
D1 = LED, red, 3 mm
D2 = LD274
T1 = BC517
IC1 = SAA3010 (see text)

Miscellaneous:
BT1 = two 1.5V batteries with holder
S1-S10 = pushbutton, PCB mount (e.g. ITT/Shadow D6)
X1 = 429kHz 2-pin ceramic resonator
JP1 = 3-way pinheader with jumper, or wire link
JP2 = wire link
S11 = 8-way SIP switch